GULYAYEV, A.P.; SAPAROV, K.

Investigating the effect of nickel, copper, and manganese on the phase constitution and properties of cast iron with spheroidal graphite. Lit. proizv. no.6:31-34 Je '63. (MIRA 16:7)

(Cast iron—Metallography)

GULYAYEV, A.P.; SAPAROV, K.

Effect of manganese on the phase composition and the properties of high-strength complex-alloy cast iron. Lit. proizv. no.7:35-36 Jl '63. (MIRA 17:1)

L 17464-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD/JG

ACESSION NR: AP3004780 S/0129/63/000/008/0002/0006

AUTHORS: Gulyayev, A. P.; Ul'yanin, Ye. A.

TITLE: Rare earth metals in structural steel

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 8, 1963, 2-6

TOPIC TAGS: rare earth metal, construction steel, 40 KhN steel, 40 Kh steel, 40 KhR steel, 40 KhNR steel, Pr, Ce, La, Nd, praseodymium, cerium, lanthanum, neodymium

ABSTRACT: Authors studied the effects of rare earth metals such as cerium, lanthanum, neodymium and praesodymium upon the properties of 40 Kh steel. In addition to analyzing the effect of individual rare earth metals, complex admixtures in the form of mischmetal, containing 50% Ce, 22% La, 10% Nd and 5% Pr, were studied at the same time. The effect of these metals upon the hardenability, strength, plasticity, ductility and reversible temper brittleness tendencies were studied. Authors found that oxidation of the rare earth metals depends upon amount of admixture. The more rare metal quantity put in, the faster they burned out. All of the rare metals are powerful

Card 1/2

L 17464-63

ACCESSION NR: AP3004780 2

desulfurizers. Degree of desulfurization increases with increase of rare metal admixture. All of the rare earth elements increase hardenability. The degree of their effect is variegated, however. Cerium and lanthanum do not increase the critical diameter as much as do neodymium and praesodymium. When neodymium and praesodymium are put into the steel, the hardenability increases in proportion to the admixtures. Mischmetal occupies an intermediate position between cerium-lanthanum and neodymium-praesodymium. None of the rare metals have an effect upon the strength and plasticity of the 40 Kh steel. Cerium has no effect upon temper brittleness tendency. Temper brittleness is somewhat checked with a 0.30% admixture of La. Neodymium and praesodymium reduce the temper brittleness tendency. Orig. art. has: 5 tables.

ASSOCIATION: TsNIIChM (Central scientific research institute for ferrous metallurgy)

SUBMITTED: 00 DATE ACQ: 06Sep63 ENCL: 00

SUB CODE: ML, EL NO REF SOV: 003 OTHER: 002

Card 2/2

GULYAYEV, A.P.; LESHCHINSKAYA, R.P.

Naphtalenelike fracture of high-speed steel. Metalloved. i term. obr. met. no.9:22-27 S '63. (MIRA 16:10)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii i Vsesoyuznyy neftegazovyy nauchno-issledovatel'skiy institut.

ACCESSION NR: AT4007049 S/2598 /63/000/010/0262/0264

AUTHOR: Gulyayev, A. P., Shelest, A. Ye.; Mishin, V. I., Kossakovskaya, N. N., Pavlov, I. M.

TITLE: Effect of furnace atmosphere on notch toughness of commercial grade titanium

SOURCE: AN SSSR. Institut metallurgii. Titan i yego splavy*, no. 10, 1963. Issledovaniya titanovy*kh splavov, 262-264

TOPIC TAGS: titanium, titanium property, titanium notch toughness, titanium embrittlement, titanium heat treatment, heat treating furnace, furace atmosphere, oxidizing atmosphere, protective atmosphere, protective coating

ABSTRACT: Specimens of hot-rolled titanium sheet with an initial impact toughness of 6 kg-m/cm^2 were heated in quartz ampules in an atmosphere of air, oxygen or nitrogen or in a vacuum (0.01 mm Hg) at temperatures of 700-1200C for 10, 60 or 120 minutes, after which the specimens were tested for impact toughness, microhardness and weight of oxide film formed. Heating in a vacuum had no significant effect on either weight or impact toughness. Determination of sample weight after removal of the scale showed that oxidation increases with time and increasing temperature, and is markedly decreased in a

Card 1/3

ACCESSION NR: AT4007049

nitrogen atmosphere, especially at high temperatures. However, as shown in Fig. 1 of the Enclosure, prolonged heating in nitrogen at 900C or above reduces the impact toughness, so that nitrogen atmospheres also cannot be recommended. The impact toughness, which increased somewhat on heating at low temperatures due to recrystallization, decreased sharply at 800-1200C in all media. Measurements of the depth of the gas-saturated layer, evaluated from the microhardness, showed that the depth increased uniformly with time and temperature in all media. In alpha-titanium (below 900C), however, nitrogen diffused less rapidly than oxygen, while after transformation to beta-titanium (above 900C) the opposite was true. Orig. art. has: 3 figures.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute, AN SSSR)

SUBMITTED: 00	DATE ACQ: 27Dec63	ENCL: 01
SUB CODE: MM	NO REF SOV: 006	OTHER: 000

Card 2/3

ACCESSION NR: AT4007049

ENCLOSURE: 01

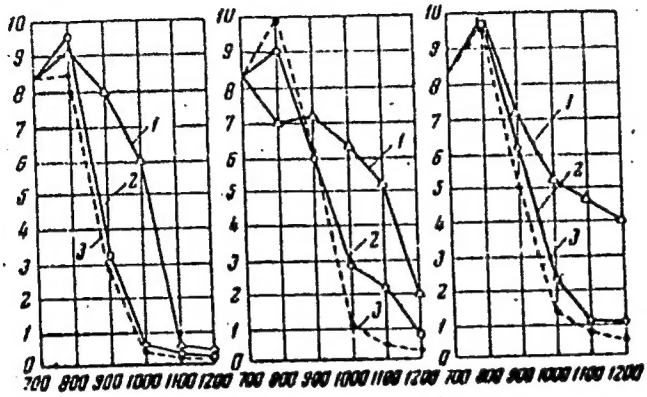


Fig. 1. Effect of temperature, duration of heating and furnace atmosphere on the impact toughness of commercial grade titanium. a. heating in air, b. heating in oxygen, c. heating in nitrogen; 1 - heated for 10 min.; 2 - heated for 60 min.; 3 - heated for 120 min. Ordinate = impact toughness in kg-m/cm^2; abscissa = temperature of heating in °C.

Card 3/3

GULYAYEV, A.P.; YAKSHINA, O.K.; PERSHINA, N.F.

Siliconizing molybdenum. Sbor. trud TSNIICHM no.35:57-62 '63.
(MIRA 17:2)

BABAKOV, A.A.; GULYAYEV, A.P.; ZHADAN, T.A.; TUFANOV, D.G.

Effect of carbon on the properties of Kh16N15M3B stainless steel. Sbor. trud TSNIICHM no.35:63-66 '63. (MIRA 17:2)

ACCESSION NR: AR4027947 S/0137/64/000/002/I071/I071

SOURCE: Metallurgiya, Abs. 2I421

AUTHOR: Gulyayev, A. P.

TITLE: Study of the cavitational resistance of austenitic steels

CITED SOURCE: Sb. tr. Tsentr. in-t chernoy metallurgii, vy*p. 35, 1963, 85-91

TOPIC TAGS: austenitic steel, cavitational resistance

TRANSLATION: A study was made of four Cr-Ni steels with ~ 0.1% C, ~ 17% Cr, ~ 1.5% Mn, and various contents of Ni: 7 (I), 8 (II), 9 (III), and 10% (IV). The steels differ appreciably in the strength of austenite: in I, the martensite transformation begins at -70°, in II at -100°, and in III and IV cooling to -196° does not cause the transformation. As the Ni content decreases, i.e., as the strength of austenite decreases, the cavitational resistance increases. As a result of the cavitational action, martensite of deformation is formed in the steel with unstable austenite. The resistance of austenite against cavitational failure is raised if the cavitational action causes the formation of martensite of deformation. In order to increase the cavitational resistance of Kh18N9T steel, it is recommended that the

Card 1/2

ACCESSION NR: AR4027947

Ni content be lowered from 8-9.5 to 7-8%. B. Samarin

DATE ACQ: 19Mar64 SUB CODE: ML ENCL: 00

Card 2/2

ASTAF'YEV, A.S.; GULYAYEV, A.P.; SHCHERBAKOV, O.B.

Effect of addition alloys on the properties of the heat-affected zone of a weld joint in high-strength reinforcement steel. Sbor. trud TSNIICHM no.35:132-142 '63. (MIRA 17:2)

GUZOVSKAYA, M.A.; GULYAYEV, A.P.

Mechanism of the formation of ferritic plates of Widmanstaetten structure. Sbor. trud TSNIICHM no.35:164-166 '63. (MIRA 17:2)

ACCESSION NR: AP4009586 S/0148/64/000/001/0056/0061

AUTHOR: Gulyayev, A. P.; Ul'yanin, Ye. A.; Bogolyubov, V. A.; Merkulova, R. F.

TITLE: The behavior of rare-earth metals in liquid steel

SOURCE: IVUZ. Chernaya metallurgiya, no. 1, 1964, 56-61

TOPIC TAGS: rare-earth metals, ferrocerium, cerium, lanthanum, neodymium, praseodymium, desulfurizer, oxide-sulfide mixtures, electron microanalyzer, ferrotitanium, liquid steel

ABSTRACT: A study was made of the behavior of individual samples of rare-earth metals in steel on the basis of the speed of their burning-out process and their effect on the oxygen and sulfur content in the steel. The introduction of cerium, lanthanum, neodymium and praseodymium is followed by a sharp reduction in the oxygen content of the steel. The oxidation of rare-earth metals increases with their increasing content in steel. These metals are also active desulfurizers. A study was made also of the nonmetallic inclusions of rare-earth metals in forged steel.

Card 1/2

ACCESSION NR: AP4009586

The chemical composition of the steel was established by the use of an electron microanalyzer on any area larger than one square micron. Methodical difficulties prevented the establishment of the exact chemical composition of the inclusions (impurities); all that could be found was that they contain about 50% rare-earth metal. The optical properties of cerium, lanthanum, neodymium and praseodymium inclusions are fairly similar, the last two of them frequently occurring in the form of separate isolated globules. Orig. art. has: 3 figures and 4 tables.

ASSOCIATION: None

SUBMITTED: 10Aug63 DATE ACQ: 14Feb64 ENCL: 00

SUB CODE: EL NO REF SOV: 004 OTHER: 000

Card 2/2

GULYAYEV, A.P.; UL'YANIN, Ye.A.; BOGOLYUBOV, V.A.; MERKULOVA, R.F.

Behavior of rare-earth metals in liquid steel. Izv. vys. ucheb. zav.; chern. met. 7 no.1:56-61 '64. (MIRA 17:2)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii.

GULYAYEV, A.P.; NIKITIN, V.N.

Determining the quality of steel from impact test results for notched specimens. Zav. lab. 30 no.7:885-889 '64. (MIRA 18:3)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni Bardina.

L 36202-65 EWT(d)/EWT(m)/EWP(w)/EPF(n)-2/EWP(c)/EWG(n)/EWA(d)/EWP(v)/EP
(c)/EWP(b)/EWP(l) Pf-4/Pad/Ps-4/Pu-4 IJP(c) JD/HW/JG/WB

ACCESSION NR: AP4047502 S/0129/64/000/010/0003/0012

AUTHOR: Gulyayev, A. P.

TITLE: Steels and alloys for the building of chemical equipment

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 10, 1964, 3-12, and top half of insert facing, p. 24

TOPIC TAGS: stainless steel, oxidation resistance, Hastealloy, titanium, aluminum, molybdenum, niobium, nickel, copper, embrittlement, sulfuric acid, hydrochloric acid

ABSTRACT: The author discusses a great number of stainless steels and oxidation resistant alloys which account for the reliability and life span of chemical equipment. Cr and Ni being the main elements in stainless steel, an investigation of the Fe-Cr-Ni phase diagram which has not as yet been adequately studied is carried out. Inhomogeneity is decreased by melting two-phase steels with a narrower range of alloying elements, employing steel with alloying elements that

Card 1/2

L 36202-65
ACCESSION NR: AP4047502

3

have a lesser influence on the phase composition and by exerting magnetic property control during melting. The addition of limited amounts of Ti and Al in two-phase stainless steel was found to eliminate embrittlement. Additions of Mo and Cu enhanced the resistance to sulfuric acid attack with best results achieved in specimens having a high Ni content. Refractory metals display substantial resistance to hot sulfuric and hydrochloric acids and, particularly, Mo although its employment is made difficult by the lack of weldability. Stainless steels and Hastealloy are unsuitable for work in acid media. Nb is ductile at room temperature and large amounts of alloying elements enhance the corrosion-resistant properties of Nb steels. Orig. art. has: 15 figures and 1 table.

ASSOCIATION: TsNIIChermet

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NR REF SOV: 000 OTHER: 000

Card 2/2 JO

GULYAYEV, A.I.; NOVIKOVA, Ye.K.

Determining a tendency for grain growth in structural steels.
Zav. lab. 30 no.10:1229-1230 '64. (MIRA 18:4)

1. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni Bardina.

L 16621-65
EWT(m)/EWA(d)/EWP(t)/EWP(b) Pad IJP(c) JD/HW
ACCESSION NR: AP4049102 S/0129/64/000/011/0002/0005

AUTHOR: Gulyayev, A. P.; Karchevskaya, N. I.

TITLE: Martensitic transformation in alloys with aging martensite

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 11, 1964, 2-5

TOPIC TAGS: maraging steel, molybdenum containing steel, cobalt containing steel, iron nickel alloy, alloy martensitic transformation, complex alloy martensitic transformation, titanium coating steel

ABSTRACT: An experimental study has been made of the effect of the individual or combined addition of various amounts of Mo, Co, and Ti on the temperature range of the martensitic transformation in Fe-Ni alloys with 20—20.5% Ni. It was found that, in general, the effect of all investigated elements in the Fe-20% Ni alloy is similar to that in steels. Mo sharply lowers the temperature range of martensitic transformation, and with 8% Mo the alloy is austenitic at room temperature. Co and, to a smaller extent, Ti raise the temperature range of martensitic transformation. In complex Fe-Ni-Mo-Co alloys Mo and Co

Card 1/2

L 16621-65
ACCESSION NR: AP4049102

produce the same effect as in binary Fe-Ni alloys. Ti slightly lowers the M_s point in complex Fe-Ni-Mo-Co-Ti alloys, but has a less pronounced effect on the M_f point. With martensitic transformation completed, all alloys contain 75—85% martensite, except for alloys with 5% Mo, which contain 60—75%. The hardness of annealed (nonaged) alloy does not depend on the austenite-martensite ratio, probably because the hardness of nonaged martensite is practically the same as that of the initial austenite. Hence, in the alloys investigated, the hardness cannot be taken as the criterion of the degree of hardening. Orig. art. has: 2 figures and 3 tables.

ASSOCIATION: TsNIICherMet

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 002 OTHER: 000 ATD PRESS: 3147

Card 2/2

L 8936-65 EWT(m)/T/EWP(q)/EWP(b) ASD(m)-3 MJW/JD

ACCESSION NR: AP4044151 S/0126/64/018/002/0233/0238

AUTHOR: Gulyayev, A. P.; Shigarev, A. S.

TITLE: Recrystallization of austenite during high-temperature thermomechanical treatment

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 2, 1964, 233-238

TOPIC TAGS: thermomechanical treatment, high temperature thermomechanical treatment, low temperature thermomechanical treatment, steel ausforming, titanium alloy thermomechanical treatment, austenite recrystallization, ausformed austenite recrystallization

ABSTRACT: The recrystallization of austenite during high- and low-temperature thermochemical treatments (HTTMT and LTTMT) was investigated in order to determine the maximum permissible time between deformation and quenching. The wedge-shaped specimens of 50KhN4M (0.5% C, 1.5% Cr, 4% Ni, 0.30%Mo) steel were deformed with a single hammer blow at 900, 750, and 500C and water-quenched either im-

Card 1/3

L 8936-65
ACCESSION NR: AP4044151

mediately or after holding for a certain time at the deformation temperature. It was found that hardness of specimens quenched immediately after deformation increased continuously with increasing reduction and reached over 60 HRC at 30% reduction. Further increase of reduction had no effect on hardness of specimens deformed at 550 or 750C, but hardness of specimens deformed at 900C dropped beginning with a reduction of 60%, and at 97% reduction amounted to 60.5 HRC, the hardness of conventionally hardened steel. This means that at reductions over 60% the recrystallization immediately follows deformation. The width of (110) line in x-ray diffraction patterns decreased with reduction for all the deformation temperatures. This could be explained only by extrusion of the carbon atoms out of solid solution in the form of carbides, which was confirmed by electron microscopy. Tests with specimens quenched with some delay after deformation showed that in specimens deformed at 900C with 60% reduction recrystallization (manifested by the hardness drop) begins 5 sec after deformation and widening of (110) line, indicating the dissolution of extruded carbides 2 sec after deformation. The latter process is completed in 3 sec and the former in 5 sec; the hard-

Card 2/3

L 8936-65

ACCESSION NR: AP4044151

ness drops to 60.5 HRC. In specimens deformed at 750C with reductions of 90 or 60%, the recrystallization begins 30 and 50 min, respectively, after deformation. In the VT3-1 titanium alloy subjected to HTTMT at 850C, the (011) line of α-phase becomes wider with increasing reduction but returns to its original width 10 sec after deformation. To obtain the maximum strengthening effect from HTTMT, the deformation process and the time between deformation and quenching must be reduced to a minimum. Orig. art. has: 9 figures.

ASSOCIATION: TsNIIChERMET im. I. P. Bardina

SUBMITTED: 02Jul63 ATD PRESS: 3109 ENCL: 00

SUB CODE: MM NO REF SOV: 003 OTHER: 002

Card 3/3

L 40571-65 EPA(s)-2/EMP(k)/EWA(c)/EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(v)/EWP(t)
Pf-4 IJP(c) EM/JD/HW/JT
ACCESSION NR: AP5002944 S/0129/65/000/001/0033/0038

AUTHOR: Gulyayev, A.P.; Nikitin, V.N.

TITLE: Influence of carbon, silicon and manganese on the embrittlement tendency of steel and iron

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 1, 1965, 33-38

TOPIC TAGS: steel embrittlement, iron embrittlement, silicon brittleness, carbon brittleness, manganese brittleness, brittle failure, impact toughness, cold brittleness threshold

ABSTRACT: The purpose of this work was to determine the cold brittleness threshold in low-carbon steel and iron due to C, Si or Mn additions. As a criterion, the authors used the percentage of the viscous and brittle components causing the break. Since crystalline break is the result of brittleness, while fibrous break is the result of viscosity, the proportion of their areas in the break can be used as a criterion. Ingots were forged into billets and the latter rolled into 12 mm thick plates from which samples were cut across the direction of rolling, annealed and subjected to tensile and impact bending tests. It was found that the influence of the three elements (C, Si and Mn) on the brittleness threshold is different. Si strengthens steel but increases the threshold.

Card 1/2

L 4C571-65

ACCESSION NR: AP5002844

of cold brittleness. Mn also improves the steel strength but lowers the threshold of cold brittleness. C is the most energetic strengthening agent. Its increased content impairs the impact toughness, although it is still high under conditions of viscous destruction (> 8kg/cm^2). The cold brittleness threshold is not affected by carbon addition. Therefore C can be used as a strengthening agent in low alloy steel up to an acceptable level of weldability. All of the above applies only to steels with a ferrite-perlite structure and is not to be applied to steels with an annealed martensite structure. Orig. art. has: 5 figures and 2 tables.

ASSOCIATION: TsNIIChERMET

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 003 OTHER: 000

Card 2/2 pb

L 22573-65 EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) MJW/JD
ACCESSION NR: AP5002176 S/0032/65/031/001/0088/0094

AUTHOR: Gulyayev, A. P.; Nikitin, V. N.

TITLE: Comparison of various methods for determination of steel resistance to brittle fracture

SOURCE: Zavodskaya laboratoriya, v. 31, no. 1, 1965, 88-94

TOPIC TAGS: steel, low alloy steel, steel brittle failure, brittle failure susceptibility/18G2AF steel

ABSTRACT: In an attempt to find a reliable method and criterion for determining the susceptibility of steels to brittle fracture, specimens of 18G2AF low alloy steel (0.19% C, 1.72% Mn, 0.38% Si, 0.17% V) have been tested in following conditions: G—hot rolled, N—annealed at 900C and air cooled, P—annealed at 1200C and air cooled, and U—water quenched from 900C and tempered at 680C for 1 hr. The structure of specimens differed depending upon heat treatment but strength and ductility were of the same order: tensile strength 59—63 kg/mm^2, elongation 15—18%, and reduction of area 37—42%. Notched and unnotched specimens in various shapes and

Card 1/2

L 22573-65
ACCESSION NR: AP5002176

sizes were subjected to tensile and bend tests at temperatures ranging from +20 to -70C. Widely scattered test results indicated conclusively that the susceptibility to brittle fracture cannot be evaluated on the basis of mechanical properties. Only the structure of the fracture, i.e., whether it is crystalline or fibrous, can serve as indication of this susceptibility. Of all the tests used, the impact bend test of notched specimens is the most rigid. Orig. art. has: 3 tables and 7 figures. [ND]

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy)

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 013 OTHER: 002 ATD PRESS: 3172

Card 2/2

L 31852-65 EWT(m)/EWA(d)/T/EWP(t)/EWP(k)/EWP(b) Pf-4 MJW/JD/EM

ACCESSION NR: AP5004279 S/0126/65/019/001/0155/0158

AUTHOR: Gulyayev, A. P.; Kashnikova, M. L.

TITLE: The effect of preliminary plastic deformation on the decomposition of austenite

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 1, 1965, 155-158

TOPIC TAGS: plastic deformation, cold deformation, phase recrystallization, austenite decomposition, supercooled austenite, dilatometric test, eutectoid steel, nitrous bath, hot drawing, steel 40 KhNMA, steel 60S2, steel ShKh15

ABSTRACT: The purpose of this investigation was to study the effect of preliminary plastic deformation on the decomposition of supercooled austenite by the use of a universal-type dilatometer. Preliminary tests (designed to determine the hardness of tempered steel) established that the time required for the complete "austenization" (carbide dissolution) of a dilatometric sample at a given temperature is 1.5-2 minutes. In some brands of steel (40 KhNMA and 60S2) the preliminary deformation does not affect the hardness, during or after the tempering process, at any temperature up to 500-600C. In others, such as steel ShKh15, preliminary deformation increases the hardness. The test results do not justify the assumption that

Card 1/2

L 31852-65

ACCESSION NR: AP5004279

preliminary plastic deformation produces stable structural defects that persist even when the metal is heated to an austenitic state, or, if the defects remain after the austenization, that they do not affect the kinetics of the austenite decomposition in the perlitic and intermediate regions. Orig. art. has: 4 figures.

ASSOCIATION: TsNIIChERMET im. I. P. Bardina

SUBMITTED: 10Jan64 ENCL: 00 SUB CODE: MM

NO REF SOV: 004 OTHER: 000

Card 2/2

L 45374-65 EWP(z)/EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) Pad IJP(c) MJW/JD/HW

ACCESSION NR: AP5007006 S/0129/65/000/003/0041/0044

AUTHOR: Gulyayev, A. P.; Fel'dgandler, E. G.; Savkina, L. Ya.

TITLE: Embrittlement of ferritic-austenitic and ferritic stainless steels

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 3, 1965, 41-44

TOPIC TAGS: phase analysis, metal physical property, brittleness, austenite

ABSTRACT: The authors studied the influence of various factors on the embrittlement kinetics of steels with 21% Cr containing 0, 2, 4, and 6% nickel: 00Kh21 [0.04% C, no titanium]; 1Kh21 [0.1% C, no titanium]; 00Kh21T [0.04% C, Ti = 5 × (% C)]; 1Kh21T [0.1% C, Ti = 5 × (% C)]. Pseudobinary phase diagrams were plotted for the alloys Fe-Cr(21%)-Ni and Fe-Cr(21%)-Ni-Ti on the basis of a study of the phase composition. Using these diagrams, the authors adopted two hardening temperatures producing ferritic and ferritic-austenitic states respectively, and the tendency toward embrittlement was studied in these two states. The influence of temperature and tempering time on the impact strength and magnetic saturation of the steels was investigated. The embrittlement kinetics of the steels showed that in the embrittlement process: (a) ordering takes place at 450-500°C which disappears at 550°C and above,

Card 1/2

L 45374-65

ACCESSION NR: AP5007006

and (b) separation occurs at higher temperatures (above 500-550°C). These processes develop in the ferritic phase. In the two-phase steels, the development of brittle failure may be promoted also by the martensite transformation during the cooling of austenite depleted of alloying elements when any phases are separated during tempering. The $\alpha \rightarrow \gamma$ transition observed for long soaking periods during tempering may also affect the impace strength. Orig. art. has: 4 figures and 1 table.

ASSOCIATION: TsNIIChermet

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000

Card 2/2

GULYAYEV, A.P.; UL'YANIN, Ye.A.

Effect of rare-earth metals on the properties of 40Kh, 40KhR, and 40KhNR structural steels. Sbor. trud. TSNIICHM no.39:5-15 '65.
(MIRA 18:7)

L 59270-65 EWP(z)/EWA(c)/EWT(m)/EWP(i)/EWP(b)/T/EWA(d)/EWP(q)/EWP(w)/EWP(t)
IJP(c) MJW/JD/HW/JG
ACCESSION NR: AT5016055 UR/2776/65/000/039/0016/0023

AUTHOR: Gulyayev, A. P.; Novikova, Ye. K.

TITLE: Effect of rare earth metals and boron on the properties of high alloy structural steel

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii. Sbornik trudov, no. 39, 1965. Spetsial'nyye stali i splavy (Special steels and alloys), 16-23

TOPIC TAGS: alloy steel, metal mechanical property, impact resistance, metallographic examination, heat treatment

ABSTRACT: Three steels, 18KhNVA, 15KhGNM, and 15KhGNCh were compared on the basis of mechanical properties, and especially impact strength at low temperatures. 18KhNVA steel had the highest Ni content (4.4%) compared to the other two (1.90%). The effect of small additions of rare earth metals and boron on the properties of the substitute steel 15KhGNM were determined. Tensile properties were measured as a function of tempering temperature, while the tendency to brittle fracture was deduced from impact tests at low temperatures, for the most brittle condition. Grain

Card 1/2

L 59270-65 4

ACCESSION NR: AT5016055

sizes for austenitizing temperatures ranging from 850-1200°C were determined by two separate techniques and were tabulated for all of the steels. No difference in characteristic mechanical properties or grain growth tendencies was observed between 18KhNVA and 15KhGNM steels. These same steels, at tempering temperatures of 200°C, have almost identical thresholds of cold brittleness, while after tempering at 550 and 650°C this limit is lower for 18KhNVA. The impact strength of 18KhNVA for all tempering temperatures is somewhat lower than for 15KhGNM, because of the higher strength of 18KhNVA. Additional alloying of 15KhGNM steel with rare earth metals (0.1%) proved inaffective, since the properties of this steel were left unchanged. Boron lowers impact strength and increases transition temperature somewhat when compared to steel without boron. Orig. art. has: 6 figures, 4 tables.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 002 OTHER: 000

Card 2/2

L 59268-65 EPF(c)/EPF(n)-2/EWT(m)/EWP(k)/EWP(z)/EWA(c)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) Pf-4/Pu-4/Pad IJP(c) JD/HW/JG/WB

ACCESSION NR: AT5016058 UR/2776/65/000/039/0073/0080

67
57
B+1

AUTHOR: Babakov, A. A.; Gulyayev, A. P.; Zhadan, T. A.; Tufanov, D. G.

TITLE: Some properties of austenitic Cr-Ni stainless steels

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii. Sbornik trudov, no. 39, 1965. Spetsial'nyye stali i splavy (Special steels and alloys), 73-80

TOPIC TAGS: stainless steel, cold deformation, cold working, heat treatment, metallographic examination, metal mechanical property, martensitic transformation, corrosion resistance, impact strength

ABSTRACT: The goal of this work was to study the properties of some austenitic stainless steels used in the chemical industry. Twenty-five steels were used in the investigation, containing 17-19% Cr, 12-14% Ni, 0.04-0.06% C with minor alloying additions of Mo, Cu, W, N_2, and Si. Representative microstructures of the heat-treated steels are given after (a) quenching from 1080°C in water, and (b) quenching plus a supplementary stabilization anneal at 620°C for 10 hrs (air cool). The structures were all austenitic, however, after treatment (b) the materials displayed pro-

Card 1/2

L 59268-65

ACCESSION NR: AT5016058

nounced segregation of carbides and carbonitrides. Also the grain sizes of the various steels differed depending on the alloying elements used. By using magnetic measurements, relative amounts of martensitic phase were determined by the anisometric method of Akulova. Only after deformation at low temperatures (-70°C) is the amount of martensite significant (20-44%), while only one steel, OKh18N10T, has as much as 3% martensite after deformation at +50°C. Mechanical properties for all of the steels are given in tabular form for both heat treatments, as well as for tempering done at 350 and 500°C. Impact strengths are given both before and after tempering. The tendency of the steels toward intercrystalline corrosion depending on heat treatment was studied. Standard tests (GOST 6032-52) were made on strips of material, which were boiled in water for 24 to 48 hrs. and then bent. Intercrystalline corrosion was indicated by the appearance of cracks in the bend. This test showed that steels without Ti and Nb additions display tendencies to intercrystalline corrosion in wide tempering intervals, for all conditions. Orig. art. has: 1 figure, 3 tables.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000

Card 2/2 KC

GULYAYEV, A.P.; ZHADAN, T.A.

Possibility of replacing nickel by manganese in two-phase stainless steels. Sbor. tekhn. TSNIICHM no.39:109-111 '65. (MIRA 18:7)

L 59273-65 EWP(k)/EWP(z)/EWA(c)/EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) IJP(c)
MJW/JD/HW
ACCESSION NR: AT5016066 UR/2776/65/000/039/0170/0174

AUTHOR: Gulyayev, A. P.; Shigarev, A. S.;

TITLE: Recrystallization of austenite during ausforming

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii. Sbornik trudov, no. 39, 1965. Spetsial'nyye stali i splavy (Special steels and alloys), 170-174

TOPIC TAGS: alloy steel, martensitic transformation, heat treatment, hot working, mechanical property, recrystallization, metallographic examination, metal ausforming

ABSTRACT: Work was done on 50KhN4M steel containing: 0.5% C, 1.5% Cr, 4% Ni and 0.31% Mo. Wedge shaped samples were deformed at 900, 750, and 550°C. By using such shapes various degrees of deformation could be accomplished on one sample. Microstructures were studied in the processed samples, while the effects of increasing deformation showed up in a decrease in grain size, and generalized grain elongation. This resulted in a finer distribution of martensitic crystals upon quenching from the austenite. Hardness was found to increase sharply (to 63 R_c) with

Card 1/2

L 59273-65

ACCESSION NR: AT5016066

deformation during ausforming and quenching for all hot working temperatures. However, for 900°C the hardness dropped sharply after 75% deformation, while for the lower temperatures the hardness remained at its peak value, even up to 90% deformation. Some x-ray studies were also presented as a function of degree of deformation. Here the effect of carbon content on the (110) lines, and the effects of deformation on diffusion characteristics were also noted. Thus, further work was done on the effects of holding time during deformation at 900°C. Curves for hardness and (110) line width were simultaneously plotted as a function of holding time. During ausforming, not only is recrystallization occurring, but carbon is being forced out of the austenitic solid solution. In order to realize the maximum strengthening effect during ausforming, it is necessary to limit the holding time at higher temperatures. For 50KhN4M steel at 900°C, this time should be two seconds or less. Orig. art. has: 7 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 002 OTHER: 003

Card 2/2

L 59275-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c) AEW/JD

ACCESSION NR: AT5016070 UR/2776/65/000/039/0228/0232

AUTHOR: Gulyayev, A. P.; Fatkina, A. M.; Gudkov, S. I.

TITLE: Effect of heat treatment on the cold brittleness of 06N3 steel

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii. Sbornik trudov, no. 39, 1965, Spetsial'nyye stali i splavy (Special steels and alloys), 228-232

TOPIC TAGS: alloy steel, heat treatment, embrittlement, metallographic examination, martensitic transformation, impact testing, metal mechanical property, low temperature research

ABSTRACT: The effect of low temperatures on the brittle behavior of 06N3 steel was studied, by varying the structure and using impact transition results as a criterion of brittleness. Four heats were made by two separate melting processes, using an electric furnace and a converter. Plates of 5 and 10 mm thickness were heat treated by quenching and tempering. Mechanical properties were determined for room temperature and -183°C, as a function of tempering temperature. Microstructures of the steel are given for the normalized and tempered conditions. In the normalized state,

Card 1/2

L 59275-65
ACCESSION NR: AT5016070

the structure consists of ferrite with some pearlite at the grain boundaries. After quenching the structure is typically martensitic, and tempering above 600°C results in reformation of ferrite with carbide distributions around grain boundaries. A series of impact transition curves (down to -183°C) are shown for tempering in the 300-660°C range. Besides these, curves are plotted for the percentage of brittle fracture in the impact samples. Cold brittleness in the steels tested depends on heat treatment, the highest transition temperature (worst condition) occurring for the normalized state. The lowest transition temperature occurs for samples quenched and tempered at 500-640°C. For these two states, the remaining mechanical properties at room temperature are identical. Orig. art. has: 5 figures, 1 table.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000

Card 2/2

ACC NR: AP6036437 SOURCE CODE: UR/0370/66/000/006/0063/0067

AUTHOR: Gulyayev, A. P. (Moscow); Ustimenko, M. Yu. (Moscow)

ORG: none

TITLE: Effect of plastic deformation on the properties of OKhN40MDTYu(EP543) alloy

SOURCE: AN SSSR. Izvestiya. Metally, no. 6, 1966, 63-67

TOPIC TAGS: chromium nickel molybdenum alloy, copper containing alloy, titanium containing alloy, aluminum containing alloy, alloy thermomechanical treatment/ OKh40MDTYu alloy

ABSTRACT: The feasibility of improving the mechanical properties of OKhN40MDTYu(EP543) chromium-nickel base age-hardenable alloy while preserving its high corrosion resistance in sulfuric acid has been investigated. Alloy ingots containing (%) 0.06C, 14—17 Cr, 39—42 Ni, 4.5—5.0 Mo, 2.5—3.2 Ti. 07—1.2 Al, and 2.7—3.3 Cu were forged at 1160C into bars. After forging was completed at about 900C, the bars were air cooled, and some were annealed at 1060C and aged at 750C for 5 to 15 hr; others were aged without annealing. Mechanical tests showed that the specimens aged without annealing had a significantly higher strength but a lower ductility than the specimens aged after annealing. In both cases, a higher notch toughness was achieved with aging for 5 hr. Aging of as-forged alloy at 600—630C for 5 hr produced high strength characteristics with a satisfactory ductility and toughness (see Fig. 1). The

Card 1/3 UDC: 669.265'24-134

ACC NR: AP6036437

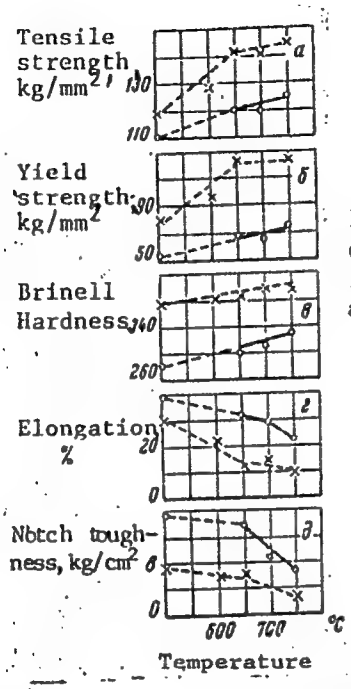


Fig. 1. Effect of aging temperature on the mechanical properties of as-forged (x) or annealed (0) OKhN40MDTYu alloy.

Card 2/3

ACC NR: AP6036437

strength characteristics first increased sharply with increased reduction in deformation; remained high, and changed only slightly with reductions greater than 10—20%. However, the ductility characteristics and impact toughness decreased while in the alloy aged in the annealed condition, the characteristics of ductility did not depend on reduction. The corrosion rate of OKhN40MDTYu alloy in 10—60% sulfuric acid solutions did not exceed 0.16 $g/m^2 \cdot hr$ regardless of the heat treatment conditions and reduction. N. N. Geveling participated in the work. Orig. art. has: 4 figures and 2 tables.

SUB CODE: 13, 11/ SUBM DATE: 13May66/ ORIG REF: 002/ ATD PRESS: 5108

Card 3/3

EWP(m)/EWA(d)/EWP(t)/ETI IJP(c) JD/HM

ACC NR: AP6013951 (A) SOURCE CODE: UR/0129/66/000/010/0034/0039

AUTHOR: Gulyayev, A. P.; Fatkina, A. M.

ORG: TSNIICHERMET

TITLE: Effect of nickel on the mechanical properties and nil-ductility transition temperature of low-carbon steels

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 10, 1966, 34-39 and appropriate insert facing p. 33

TOPIC TAGS: cryogenic steel, nickel steel, low carbon steel, ~~steel~~ metal property, ~~nil-ductility transition, nil-ductility transition temperature~~

ABSTRACT: Since chromium-nickel stainless steels suitable for cryogenic applications are very expensive, an attempt has been made to determine what nickel content would ensure a sufficiently low temperature of transition to brittle behavior (NDT temperature). Several heats of a low-carbon steel (0.02—0.05% carbon) containing from 0.12 to 9.1% nickel were tested. It was found that at contents of up to 5—7%, every 1% nickel lowers the NDT temperature by 20C. Further increases in nickel content have little or no effect on NDT temperature. Nickel also improves the strength characteristics. For instance, with nickel content increased from 0 to 9%, the yield strength increased from 30 to 60 kg/mm^2 at +20C, and from 75 to 100 kg/mm^2 at -196C. The notch toughness was found to be satisfactory (8 kgm/cm^2) with a nickel

Card 1/2 UDC: 620.17:669.15'24-194.536.43

L 09996-67

ACC NR: AP6035951

content of at least 6%. Therefore, the use of steel with 9% nickel is justified only in cases where the notch toughness of steel with 6% nickel is insufficient. The first experimental heats of steels containing 6 and 9% nickel melted and processed by the Volgograd Krasnyy Oktyabr' Plant are being tested under operational conditions. ON6A steel (0.06% max carbon, 6—7% nickel, 0.45—0.60% manganese, 0.17—0.37% silicon, 0.02% max sulfur, and 0.02% max phosphorus) has the following guaranteed minimum values of mechanical properties: yield strength 45—47 kg/mm^2, tensile strength 50—55 kg/mm^2, elongation 30—32%, reduction of area 70—75%, notch toughness 20 kgm/cm^2, and NDT temperature -180C. ON9A steel (0.06% max carbon, 8.5—9.5% nickel, 0.45—0.60% manganese, 0.17—0.37% silicon, 0.02% max sulfur, and 0.02% max phosphorus) has the following guaranteed minimum values of mechanical properties: yield strength 58—60 kg/mm^2, tensile strength 65—68 kg/mm^2, elongation 28—30%, reduction of area 70—80%, notch toughness 25 kgm/cm^2, and NDT temperature -180C. Orig. art. has: 5 figures and 3 tables.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 005/ OTH REF: 006/ ATD PRESS: 5105

Card 2/2

EWT(m)/EWA(w)/EWP(t)/ETI LJP(c) JD

ACC NR: AP6035954 SOURCE CODE: UR/0129/66/000/010/0045/0047

AUTHOR: Gulyayev, A. P.; Minayev, A. M.

ORG: Moscow Institute of Chemical Machinery (Moskovskiy institut khimicheskogo mashinostroyeniyo)

TITLE: Study of notch toughness in austenitic steels at low temperatures

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 10, 1966, 45-47

TOPIC TAGS: low temperature metal, austenitic steel, steel high strength notch toughness /Kh18N10T steel, Kh17N13M3T steel

ABSTRACT: Specimens of Kh18N10T and Kh17N13M3T steels, annealed at 1050C and water quenched, have been tested for notch toughness at temperatures from +20 to -196C. It was found that though neither steel contained martensite after annealing and quenching, some martensite was found in fractured specimens in the notch-adjacent area. This martensite was formed under the effect of deformation. It began to form in Kh18N10T steel at about +20C and in Kh17N13M3T steel at about -100C. The notch toughness of Kh17N13M3T steel first drops with decreased temperature to a minimum of about 19 kgm/cm^2 at -100C and then begins to increase, while that of Kh18N10T steel increases with decreasing temperature to maximum of 22—38 mkg/cm^2 (depending on the specimen type) at about -100C, and then begins to drop. It was established that if austenite does not transform during impact tests, the notch toughness decreases steadily with

Card 1/2 UDC: 669.14.018.298.8:620.163.4

L 09998-67

ACC NR: AP6035954

temperature decreases. The formation of martensite during testing increases the work required for crack initiation, but reduces the work for crack propagation. In this case, the curve of the temperature dependence of the notch toughness has a maximum. Orig. art. has: 4 figures.

SUB CODE: 11/ SUBM DATE: none/ ATD PRESS: 5105

Card 2/2

EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AT6026551 SOURCE CODE: UR/2776/66/000/046/0067/0075

AUTHORS: Gulyayev, A. P.; Zhadan, T. A.

ORG: none

TITLE: Investigation of the properties of steel OKh18G8N2T

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii. Sbornik trudov, no. 46, 1966. Spetsial'nyye stali i splavy (Special steels and alloys), 67-75

TOPIC TAGS: alloy steel, nickel steel, chromium steel, steel / OKh18G8N2T steel

ABSTRACT: The effect of Cr, Mn, and Ni on the structure and properties of steel OKh18G8N2T was investigated. Two specimens were studied, representing the ferrite and austenite region limits in the steel, respectively. The investigation supplements the results of A. P. Gulyayev and T. A. Zhadan (Sb. trudov TsNIIChM, Spetsial'nyye stali i splavy, vyp. 39, Izd. Metallurgiya, 1965, s. 109). The phase composition, the usual mechanical properties, and the magnetic saturation of the steel were determined as a function of the thermal treatment and degree of deformation of the latter. The experimental results are presented graphically (see Fig. 1). It was found that the mechanical properties of the steel were almost independent of the phase composition in the composition range of 25--30% α-phase. Embrittlement

Card 1/2

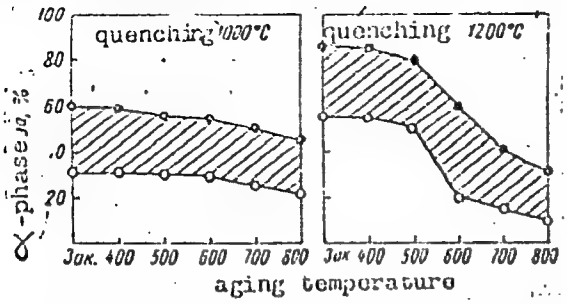


Fig. 1. Change in the amount of the α-phase as a function of the aging temperature. Solid points: ferrite-like phase; open circles: austenite-like phase.

becomes most intensive at 600--700C. The tendency towards intercrystalline corrosion was observed for steels containing more than 85% of the α-phase. The following composition for the steel is recommended: ≤ 0.08% C, ≤ 0.8% Si, 17--19% Cr, 7--9% Mn, 2.1--2.8% Ni, and 0.3--0.5 % Ti. Orig. art. has: 1 table and 10 graphs.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 005

Card

L 00954-67 EWT(m)/EWP(w)/EWP(t)/ETI IJP(c) JD
ACC NR: AT6026557 SOURCE CODE: UR/2776/66/000/046/0170/0175

AUTHORS: Gulyayev, A. P.; Zikeyev, V. N.; Moshcherinova, O. N.

ORG: none

TITLE: Influence of carbon content on the cold-shortness threshold of structural steel

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii. Sbornik trudov, no. 46, 1966. Spetsial'nyye stali i splavy (Special steels and alloys), 170-175

TOPIC TAGS: alloy, steel, chromium steel, nickel steel, molybdenum steel, metallurgic research

ABSTRACT: The effect of the carbon content on the cold-shortness threshold of chromium-nickel-molybdenum steel was investigated. The specimens were quenched and subsequently annealed in two stages to hardness HRC = 20--25 and HRC = 30--35 respectively. The cold-shortness threshold was determined in terms of the fraction of the brittle component in the fracture of the specimen. The cold-shortness threshold temperature was taken as the temperature at which the fracture contained 10 and 50% of the brittle component respectively. The experimental results are presented in graphs and tables (see Fig. 1). It was found that an increase in the carbon content in Cr-Ni-Mo steel leads to an increase of the cold-shortness threshold. The

Card 1/2

L 09953-67
ACC NR: AT6026557

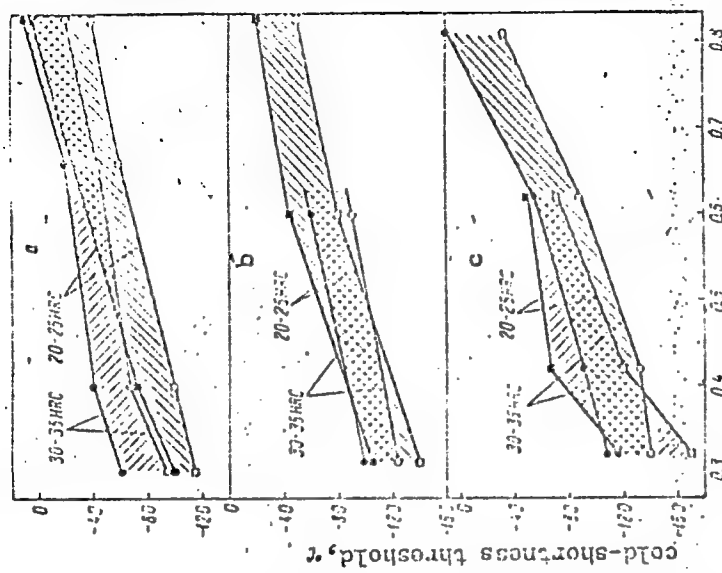


Fig. 1. Influence of carbon on the cold-shortness threshold of steels: a - 30-60KhN; b - 30-60KhNM; c - 30-60KhNMF; solid squares and circles - 10% of brittle component; open squares and circles - 50% of brittle component.

most effective decrease in the cold shortness threshold of improved structural steels is achieved by the addition of 1.6 Ni. Orig. art. has: 2 tables and 3 graphs.

SUB CODE: 11,13/ SUBM DATE: none/ ORIG REF: 009/ OTH REF: 002

L 01929-67 EWT(m)/EWP(t)/ETI IJP(c) WB/JD

ACC NR: AR6031071 (N) SOURCE CODE: UR/0277/66/000/007/0013/0013

AUTHOR: Gulyayev, A. P.; Zelenova, Z. P.

TITLE: Study of resistance of austenitic steels to cavitation

SOURCE: Ref. zh. Mashinostr mat konstr i raschet detal. mash. Gidropr, Abs. 7.48.89

REF SOURCE: Sb. Kavitats. i gidroabrazivn. stoykost' met. v gidroturbinakh. M., Mashinostroyeniye, 1965, 71-74

TOPIC TAGS: steel, austenitic steel, stainless steel, cavitation resistance, martensite, magnetostriction oscillator

ABSTRACT: The effect of austenite transformation to martensite on the cavitation resistance of stainless steel samples was studied, using a magnetostriction oscillator. It is pointed out that due to the effect of cavitation in steels with unstable austenite martensite forms which increases the wear resistance of the steel. To decrease the stability of austenite in 0.2Kh19N9T and 0.4Kh19N9T steels and at the same time to increase their cavitation resistance, it is suggested that the nickel content be reduced from 8—9% to 7—8%. Orig. art. has: a bibliography of 3 reference items. [Translation of abstract] [AM]

Card 1/1 hs SUB CODE: 13/ UDC: 669.14.018.8:620.193.16

ACC NR: AP6031719 (N) SOURCE CODE: UR/0370/66/000/005/0102/0106

AUTHOR: Gulyayev, A. P. (Moscow); Zotova, Ye. V. (Moscow); Ustimenko, M. Yu. (Moscow); Posysayeva, L. I. (Moscow)

ORG: none

TITLE: Development of high-strength corrosion-resistant alloy

SOURCE: AN SSSR. Izvestiya. Metally, no. 5, 1966, 102-106

TOPIC TAGS: IRON BASE ALLOY, CHROMIUM BASE ALLOY, NICKEL BASE ALLOY, corrosion resistant alloy, high strength alloy, age hardenable alloy, iron chromium nickel alloy, molybdenum containing alloy, copper containing alloy, titanium containing alloy, aluminum containing alloy/OKhN40MDTYu alloy

ABSTRACT: OKh23N28M3D3T (EI943) steel has adequate corrosion resistance in sulfuric acid at temperatures up to 80C but its low strength limits its use in the modern chemical industry. Therefore, efforts have been made to develop an alloy which will combine the necessary corrosion resistance with adequate strength. A series of iron-chromium-nickel-base alloys additionally alloyed with titanium, niobium, aluminum, molybdenum and copper were tested. On the basis of experimental findings, the new OKhN40MDTYu alloy (Electrostal Plant designation EP543) was developed. The alloy contains 0.06 carbon, 0.8% silicon, 0.8% manganese, 14—17% chromium, 39—42% nickel, 4.5—6% molybdenum, 0.7—12% aluminum and 2.7—3.3 copper. The alloy is age-hardenable. Alloy solution-heat treated and aged at 700—800C has the following minimum values of

Card 1/2 UDC: 669.018.8

ACC NR: AP6031719

mechanical properties: tensile strength 100 kg/mm^2, yield strength 70 kg/mm^2 and elongation 10%, compared to 50—55 kg/mm^2, 20—25 kg/mm^2, and 30—35% for EI943 steel. The corrosion rate of the new alloy in sulfuric acid at concentrations up to 40% and temperatures up to 50C is approximately 0.1 g/m^2/hr. Orig. art. has: 2 figures and 3 tables. [ND]

SUB CODE: 11/ SUBM DATE: 10Mar66/ ORIG REF: 007/ ATD PRESS: 5090

Card 2/2 mt

L 47449-66 EWT(m)/EWP(w)/T/EWP(t)/ETI/EWP(k) IJP(c) JD/HW

ACC NR: AP6014606 (N) SOURCE CODE: UR/0133/66/000/005/0461/0464

AUTHORS: Gulyayev, A. P.; Anuchkin, M. P.; Georgiyev, M. N.; Dogadayeva, V. A.

ORG: All-Union Scientific Research Institute for the Production of Pipe Mains (Vsesoyuznyy n.-i. institut po stroitel'stvu magistral'nykh truboprovodov); TsNIIChM

TITLE: A study of the cold shortness of heat-treated steels for pipe manufacture

SOURCE: Stal', no. 5, 1966, 461-464

TOPIC TAGS: steel pipe, steel property, steel tempering, steel testing / 17GS steel, 14GN steel

ABSTRACT: The effectiveness of heat treating steels 17GS and 14GN to increase their resistance to cold shortness was tested. Steel 17GS was produced in the Cherepovets Metallurgical Plant (Cherepovetskiy metallurgicheskiy zavod); steel 14GN was produced in the Orsk-Khalilovskiy Metallurgical Combine (Orsko-Khalilovskiy metallurgicheskiy kombinat). Their respective elemental compositions are:

	C	Si	Mn	Ni	Cr
17GS	0,19	0,43	1,35	0,36	—
14GN	0,16	0,31	1,00	0,50	0,16

	S	P	O_2	H_2	N_2
17GS	0,014	0,01	0,003	0,0004	0,003
14GN	0,027	0,02	0,023	0,0007	0,005

UDC: 669.14.018.85

Card 1/2

ACC NR: AP6014606

Fragments cut from the pipes were heat treated and machined into specimens for mechanical testing. The type of heat treatment is explained. Mechanical properties of the two materials were tested for their change in respect to the temperature of tempering, and the results of these tests are presented graphically. In the tension tests, the method of N. A. Kahn and E. A. Imbembo (The Welding Journal, 1950, v. 29, No. 2, p. 82s--96s) was applied. A study of impact strength revealed an almost straight-line relation between this property and the cross section width. The type of failure and the crack formation were investigated and are shown for various temperatures and areas, while the microstructure of the two steels at various types of tempering is presented photographically. The materials were further tested for their embrittlement at various heat treatments, with the results of the embrittlement experiments shown in a table. It is noted that steel 17GS is most resistant to embrittlement after being hardened and tempered at 600C, and steel 14GN at 500C. Temperatures of -60 and -40C are, respectively, the lowest to which the two investigated steels may be subjected. Orig. art. has: 9 figures, 1 microphotograph, and 1 table.

SUB CODE: 13,11/SUBM DATE: none/ ORIG REF: 001/ OTH REF: 004

Card 2/2 mjs

L 29008-66 EWT(m)/EWP(t)/ETI JD

ACC NR: AP6018841 SOURCE CODE: UR/0413/66/000/007/0061/0061

AUTHOR: Gulyayev, A.P.; Yukalov, I.N.; Fedorov, V.K.; Yakhnina, V.D.; Saparov, K.; Landa, A.F.

34
9

ORG: none

TITLE: Nonmagnetic iron. Class 40, No 180353

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 7, 1966, 61

TOPIC TAGS: cast iron, nickel containing alloy

ABSTRACT: A new nonmagnetic cast iron is proposed which has a reduced nickel content. This iron has the following chemical composition (in %):

Carbon	3.0-3.1
Silicon	2.7-3.14
Manganese	6-8
Sulfur	0.02-0.03
Phosphorus	0.05-0.06
Chromium	0.1-0.2
Nickel	5-6
Copper	2.0-2.5
Magnesium	0.1-0.14

[PRS]

SUB CODE: 11 / SUBM DATE: 21Aug64/

Card 1/1 BLG

UDC: 669.131.7

GULYAYEV, A.; KORZHEV, V.

Studying two zonal catalogs of the astronomical observatory of Yale University. Astron. zhur. 30 no.3:340-347 My-Je '53. (MLRA 6:5)

1. Gosudarstvennyy astronomicheskiy institut imeni P.K. Shternberga.
(Stars--Catalogs)

GOLYAYEV, A.P., Cand Phys-Math Sci--(dis) "Determination of the direct ascents of stars of the list FKCh of the polar region on the meridian circle of the Moscow Observatory during the period 1953-1955." Kiev, 1956. 7 pp (Mos State U im M.V. Lomonosov. State Astronomical Inst im P.K. Shternberg), 100 copies (KL,26-57,105)

GULYAYEV, A.P.

Comparison of the catalog of right ascensions of stars in the vicinity of the pole with the FK3. Astron. tsir. no.188:23-24 Ja '58. (MIRA 11:6)

1. Gosudarstvennyy astronomicheskiy institut im. P.K. Shternberga.
(Stars--Catalogs)

GULYAYEV, A.P.

Methods for determining irregularities of trunnions using as an example the investigation of the Moscow meridian circle [with summary in English]. Astron. zhur. 35 no.1:148-156 Ja-F '58. (MIRA 11:3)

1. Gosudarstvennyy astronomicheskiy institut im. P.K. Shternberga.
(Transit circle--Testing)

S/035/61/000/011/003/028
A001/A101

AUTHOR: Gulyayev, A.P.

TITLE: The study of the system of FK3 star right ascensions in the circumpolar region according to observations with the Moscow meridian circle

PERIODICAL: Referativnyy zhurnal. Astronomiya i Geodeziya, no. 11, 1961, 11, abstract 11A99 ("Tr. 14-y Astrometr. konferentsii SSSR, 1958", Moscow-Leningrad, AN SSSR, 1960, 116-120, Discuss. 120, Engl.summary)

TEXT: The author describes the method of observations and compilation of the catalog for 99 FK3 circumpolar stars from observations conducted in 1955-1956 with the GAISh meridian circle (cf. RZhAstr, 1961, 5A96). An investigation of the system of the catalog obtained shows the presence of errors $\Delta\alpha_\alpha$ and $\Delta\alpha_\delta$ of noticeable magnitude. The system of the catalog is close to N30 up to +85° in respect to $\Delta\alpha_\delta$. The differences, catalog - FK3, of the $\Delta\alpha_\alpha$ values agree well in phase with the errors of the FK3 catalog known from the other studies, in

Card 1/2

S/035/61/000/011/003/028
A001/A101

The study of the system of FK3 star ...

the zone +55° - 75° which contained fundamental stars used in observations. The graphs of differences, catalog - FK3 and catalog - FK3 Supp, are presented for $\Delta\alpha_\alpha$ and $\Delta\alpha_\delta$, as well as of differences FK3 - N30.

Kh. P.

[Abstracter's note: Complete translation]

Card 2/2

GULYAYEV, A.P.

Catalog of the right ascensions of stars in the vicinity of the pole. Soob.GAISH no.104:74-77 '61. (MIRA 15:3)
(Stars--Catalogs)

GULYAYEV, A.P.

Determining right ascensions of stars in the vicinity of the pole observed on the Moscow Repsold meridian circle in 1955-1956. Trudy GAISH 30:104-158 '61. (MIRA 14:8)
(Transit circle) (Stars--Observations)

PODOBED, Vladimir Vladimirovich; GULYAYEV, A.P., red.; BRUDNO, K.F., tekhn. red.

[Fundamental astrometry; determination of stellar coorinates] Fundamental'naia astrometriia; opredelenie koordinat zvezd. Moskva, Gos. izd-vo fiziko-matem. lit-ry, 1962. 340 p. (MIRA 15:4)

(Astrometry)

GULYAYEV, A.P.

Additional observations of FKSZ stars from + 75° to the pole.
Trudy GAISH 31:128-130 '62. (MIRA 15:5)
(Stars--Observations)

OGILVIY, A.F.

Steel and alloys for chemical machinery construction. Metalloved. i term. obr. met. no.10:3-12 O '64.

(MIRA 17:12)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni I.P. Bardina.

[illegible], [illegible].

Using the method of [illegible] and [illegible]. Soob. [illegible] no.134: 24-29 '64. ([illegible])

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320010-1"

GULYAYEV, A.P.; [illegible], O.A.; KABAYEVA, N.N.

Observations of right ascensions of the sun, Mercury and Venus with the new meridian circle at the Moscow Observatory. Soob. GAISH no.134:21-23 '64. (MIRA 17:8)

L 2525-66 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c) IJP(c) JD/HW
ACCESSION NR: AP5020706 UR/0129/65/000/008/0020/0025
66.046.51

39
31
8

AUTHOR: Gulyayev, A. P. 44,55

TITLE: Theory of the optimal degree of alloying

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 8, 1965, 20-25

TOPIC TAGS: alloying, steel alloying, alloying limitation

ABSTRACT: Alloying has no direct effect on the mechanical properties of steels and alloys. In the case of steel, alloying affects the temperature of the critical points and the critical cooling rates and increases hardenability, but the mechanical properties of structural steels (0.60% max carbon) can be changed in a wide range by changing only the carbon content and the tempering temperature, provided that the specimen size ensures full hardening throughout the entire cross section. This was proved experimentally. More than 100 carbon and alloy steels containing 0.10—0.60% carbon, 0—5.00% nickel, 0—3.00% chromium, and other elements were melted under identical conditions, austenitized to the same grain size of approximately 10, and quenched and tempered at various temperatures. The obtained values of mechanical properties of all the steels tested fall into a relatively narrow band of natural scattering (see Fig. 1 of the Enclosure). Of course, as

Card 1/4

the part or specimen cross section increases, alloying becomes necessary to increase hardenability. In this case, however, excessive alloying brings no additional benefits. These conclusions are based on tests under conditions of uniaxial stresses and low strain rates. If the effect of alloying is evaluated on the basis of susceptibility to brittle fracture, then it becomes apparent that excessive alloying has a detrimental effect. Alloying up to a certain degree reduces grain size and improves hardenability and thus lowers the susceptibility to brittle fracture. However, when the optimum degree of alloying is exceeded, the excess of alloying elements concentrates primarily at the grain boundaries where it increases the number of defects and promotes brittle fracture. In addition, alloying usually lowers the M_s point, which promotes microcrack formation and thus increases the susceptibility to brittle fracture. Similar phenomena can be observed in stainless, heat-resistant, and high-speed steels and alloys. There is always an optimum degree of alloying which brings the maximum improvement of certain characteristics. Further alloying in excess of this optimum has a detrimental effect. Orig. art. has: 3 figures and 2 tables. [DV]

ASSOCIATION: TsNIIChERMET 44.55

L 2525-66
ACCESSION NR: AP5020706

0

SUBMITTED: 00 ENCL: 01 SUB CODE: MM

NO REF SOV: 012 OTHER: 001 ATD PRESS: 4108

Card 3/4

L 2525-66

ACCESSION NR: AP5020706

ENCLOSURE: 01

Tensile strength, yield strength, kg/mm^2

Reduction of area, %

Notch toughness, mkg/cm^2

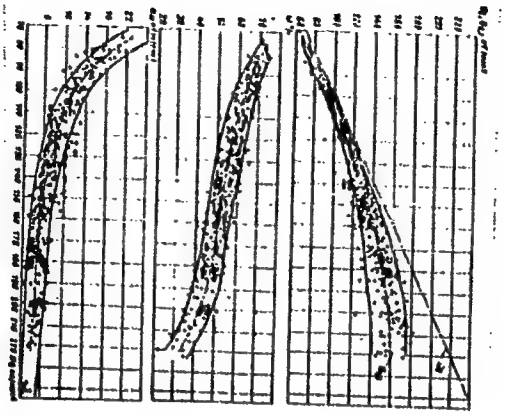


Fig. 1. Yield strength, reduction of area, and notch toughness versus tensile strength

Theory of alloying

Carbon Steel

Card 4/4

L 9645-66 EWT(m)/EWP(w)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(z)

ACC NR: AP5027702 SOURCE CODE: UR/0129/65/000/011/0009/0017

AUTHOR: Gulyayev, A. P.

ORG: TsNIIChERMET

TITLE: Structural changes during the combined hot and cold working of steel and their effect on mechanical properties [Paper presented at the 4th Conference of Metallographers of the Polish Academy of Sciences held in Gliwice in September 1965]

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 11, 1965, 9-17 and both sides of insert between p. 24 and 25

TOPIC TAGS: cold working, heat treatment, work hardening, austenite transformation, carbide phase

ABSTRACT: Combined hot and cold working, or thermomechanical treatment (TMT), refers to treatment where hardening or some other change in properties is produced by the combined effect of plastic deformation (work hardening) and phase (structural) transformations. This thermomechanical treatment may be divided into two classes: A) TMT of metals and alloys which undergo polymorphic transformations (ordinary steels and Ti alloys); B) TMT of alloys which do not undergo polymorphic transformations but contain soluble excess phases -- certain austenitic steels, Ni-base heat resistant alloys of the nimonic type, alloys based on refractory metals, etc. Class A is sub-

Card 1/2 UDC: 620.17:539.374:621.785

L 9645-66

ACC NR: AP5027702

divided into three types of TMT: deformation above recrystallization temperature (ATMT), deformation below recrystallization temperature (BTMT) and deformation prior to transformation during heating (PTMT). In the case of PTMT investigations showed that preliminary deformation prior to hardening (by various techniques and to varying degree) does not affect the behavior of supercooled austenite: the kinetics of the decomposition of austenite remains the same. Moreover, following PTMT, X-ray line width is greater than following conventional hardening, since deformation during PTMT occurs in α-state, which does not contain C, and hence the deformation cannot cause segregation of carbide phase. By contrast, deformation during ATMT and BTMT leads to the segregation of C from austenite, although in the case of ATMT the austenite is not supersaturated. Furthermore, PTMT is technically simpler to carry out than ATMT and BTMT. The change in properties following TMT is produced by a number of factors: reduction in grain size, pile-up of defects during deformation, and increase in temperature of martensitic transformation. The variation in the amount of residual austenite and the formation of disperse carbides also are important factors. The ultimate result is an increase in the strength and plasticity of the metal. Orig. art. has: 13 figures, 4 tables.

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 017/ OTH REF: 005

Card 2/2

L 2449-66 EWT(m)/EPF(c)/EWP(t)/EWP(z)/EWP(b) IJP(c) JD/HM/JG/WB

ACCESSION NR: AP5021979 UR/0286/65/000/014/0042/0042

669.14.018.84
669.15'24'26'28-194

AUTHOR: Gulyayev, A. P.; Zogova, Ye. V.; Posysayeva, L. I.; Ustimenko, M. Yu.

TITLE: Iron-base alloy. Class 18, No. 172869

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 14, 1965, 42

TOPIC TAGS: alloy, iron alloy, nickel containing alloy, chromium containing alloy, titanium containing alloy, aluminum containing alloy, molybdenum containing alloy, silicon containing alloy, copper containing alloy, manganese containing alloy

ABSTRACT: This Author Certificate introduces an iron-base alloy which, for increased corrosion resistance, contains 0.09% max carbon, 35—45% nickel, 14—19% chromium, 2—4% titanium, 0.8—1.5% aluminum, 4—8% molybdenum, 2—4% copper, 0.5% max silicon, and 0.8% max manganese. [AZ]

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy)

Card 1/1

L 2449-66

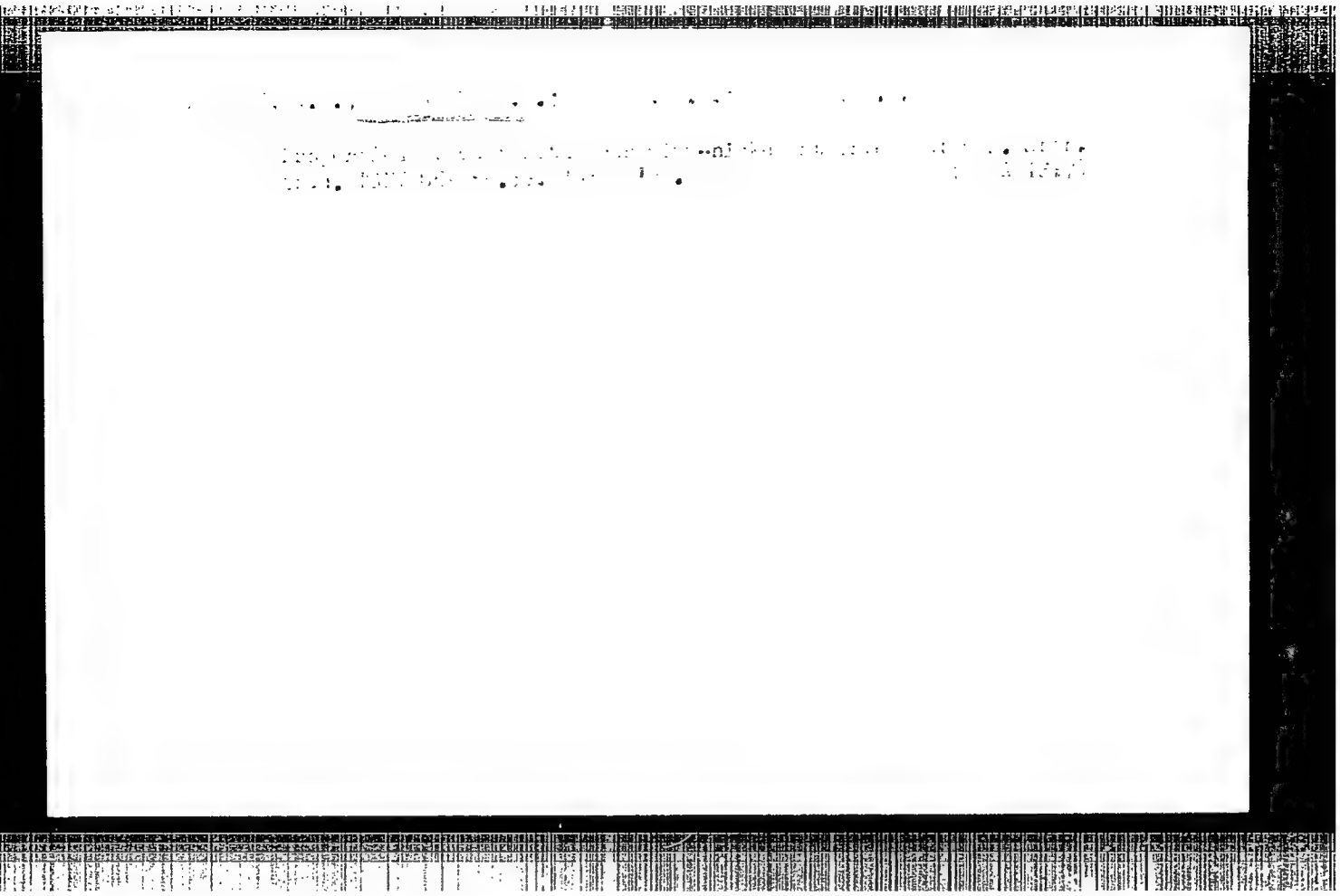
ACCESSION NR: AP5021979 O

SUBMITTED: 02Nov63 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000 ATD PRESS: 4109

BVK

Card 2/2



GULYAYEV, A.P.; SHIGAREV, A.S.

Recrystallization of austenite during high-temperature thermo-mechanical treatment. Fiz. met. i metalloved. 18 no.2:233-238 Ag '64. (MIRA 18:8)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni I.P.Bardina.

GULYAYEV, A.P. (Moskva)

Production methods and the properties of steel. Izv. AN SSSR. Met. no.5:15-26 S-O '65. (MIRA 18:10)

GULYAYEV, A.P.; FEL'DGANDLER, E.G.; SAVKINA, L.Ya.

Embrittlement of ferritic austenitic and ferritic stainless steels. Metalloved. i term. obr. met. no.3:41-44 Mr '65. (MIRA 18:10)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni I.P. Bardina.

GULYAYEV, A.P.

Structural changes during the thermomechanical treatment of steels and its effect on their mechanical properties. Metalloved. i term. obr. met. no.11:9-17 N '65.

(MIRA 18:12)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii.

(N) L 12086-66 EWP(e)/EWT(m)/EWP(w)/ETC(F)/EWG(m)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)
ACC NR: AP6000601 LJP(c) MJW/JD/HW/JG/WB/AT/WH UR/0129/65/000/012/0002/0005

AUTHOR: Gulyayev, A. P.; Miroshnikova, K. Ye.

ORG: Moscow Institute of Chemical Machine Building (Moskovskiy institut khimicheskogo mashinostroyeniya)

TITLE: Intercrystalline corrosion of certain austenitic stainless steels

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 12, 1965, 2-5, and top half of insert facing p. 40, and both sides of insert between p. 24 and 25

TOPIC TAGS: intercrystalline corrosion, corrosion test, stainless steel, austenite, carbide

ABSTRACT: At 400-800°C processes causing proneness to intercrystalline corrosion occur in austenitic stainless steels. Bain (Chemistry and Industry, 1932, v. 51) attributes this to the depletion of Cr along grain boundaries, while Stickler and Vinckier (Mem. scient. rev. metallurgie, 1963, v. 60, no.7-8) believe that this is caused by the special alignment of carbides along grain boundaries and the difference in the potentials of the carbide-austenite micro-pair. Accordingly, these processes were investigated at the specified temperatures for four types of austenitic stainless steels: EI943, EP212, EI711, and Kh18N10T. Specimens of these steels (90x20x4 mm) were water-quenched from 1050-1100°C and tempered at 500, 550, 600, 650, 700, 750 and 850°C for

Card 1/2 UDC: 669.14.018.240.620.195

L 12086-66

ACC NR: AP6000601

from 10 min to 1000 hr and subjected to corrosion tests. The Cr content at grain boundaries was determined by means of local X-ray spectral analysis. Findings: intensive intercrystalline corrosion develops in EI943, EP212 and EI711 steels at 700°C and in Kh18N10T steel at 600°C. Proneness to intercrystalline corrosion is caused by the segregation of carbide networks along grain boundaries. The difference in electrochemical potentials between the network of carbides and austenite constitutes the motive power of intercrystalline fracture. The volume of metal surrounding a carbide inclusion is subject to corrosion fracture. If the carbides are spaced sufficiently far apart, these volumes will not be in mutual contact and hence there will be no continuous penetration of the corrosion medium into the metal interior along the grain boundaries: in such cases the steel is not prone to intercrystalline corrosion. In cases of a more aggressive medium, on the other hand, a larger volume of metal around carbide inclusions is subject to corrosion. These volumes contact, and this is accompanied by a continuous penetration of the corrosion medium into the metal interior along the grain boundaries: in such cases the steel is prone to intercrystalline corrosion. Further, no depletion of Cr from the boundaries of austenite grains has been found in steel prone to intercrystalline corrosion. Orig. art. has: 1 table, 6 [4] figures.

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 003/ OTH REF: 002

Card 2/2

GULYAYEV, A.P., [illegible], T.Ya.

Corrosion resistance of binary niobium alloys. Zashch.met. 1 no.6:652-657 N-D '65. (MIRA 18:12)

1. Moskovskiy institut khimicheskogo mashinostroyeniya.

L 10231-66 EWT(m)/EPF(n)-2/EWA(d)/EWP(t)/EWP(z)/EWP(b) LIP(c) MJW/JD/WW/JG
ACC NR: AP5027147 SOURCE CODE: UR/0126/65/020/004/0592/0596

AUTHOR: Georgiyeva, I. Ya.; Gulyayev, A. P.

ORG: Moscow Institute of Chemical Machine Building (Moskovskiy institut khimicheskogo mashinostroeniya)

TITLE: Hardness of binary niobium alloys

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 4, 1965, 592-596

TOPIC TAGS: alloy, binary niobium alloy, niobium containing alloy, vanadium containing alloy, tantalum containing alloy, titanium containing alloy, zirconium containing alloy, molybdenum containing alloy, tungsten containing alloy

ABSTRACT: The hardness of binary Nb alloys with V, Ta, Ti, Zr, Mo, and W has been investigated. All these alloys except Zr form a continuous series of solid solutions which are stable at room temperature. Nb-Zr solid solutions are stable only above 1000C. Alloys were homogenized in a vacuum of $1—5 \cdot 10^{-5}$ mm Hg at temperatures 400—500° below the melting point. A content of 5—10 at% vanadium (atomic radius 1.36 Å) was the most effective strengthener, followed closely by Mo and W (atomic radii, 1.40 Å and 1.42 Å respectively). At a content higher than 10 at%, W has a stronger effect than V. These elements decrease the lattice parameter of niobium and create compression stresses (the atomic radius of Nb is 1.47 Å). Ta and Ti,

Card 1/2 UDC: 539.53:546.882

L 10231-66
ACC NR: AP5027147

2

whose atomic radii (1.46 and 1.45 Å) are close to that of Nb, do not change the lattice parameter significantly and do not increase hardness. Zr (atomic radius 1.60 Å) increases the lattice parameter, causes tension stresses in the lattice, and increases the hardness, but to a lesser degree than does compression. With increasing temperature the hardness of Nb-Ti and Nb-Ta alloys drops at the same rate as that of pure Nb. Nb-V alloys soften more rapidly, especially in the range 700—800C. The hardness of Nb-15 at% V and Nb-15 at% W alloys, 333 and 347 HV at room temperature, drops at 1000C to 139 and 216 Hv, respectively. The hardness of unalloyed niobium drops from 180 HV at room temperature to 75 HV at 1000C. Hardness is also affected by the content of interstitial impurities. Vacuum annealing of alloys, the use of vacuum melting, or the use of high-purity initial materials decrease the room temperature hardness by 40—60 HV. Orig. art. has: 4 figures. [WW]

SUB CODE: 11/ SUBM DATE: 20Oct64/ ORIG REF: 003/ OTH REF: 001/ ATD PRESS: 4163

Card 2/2

[illegible], A.P.; [illegible], A.A.; LUNDA, V.I.

Methods for and results of the phase analysis of [illegible] steels. Zav.lab. 31 no.3:298-318 '65.

(MIRA 18:4)

L 15[illegible]-66 EWT(m)/EWA(d)/T/EWT(l)/EWP(k)/EWP(z)/EWP(b) MJW/JD/WH

ACC NR: AP6003303 (N) SOURCE CODE: UR/0129/66/000/001/0022/0024

AUTHOR: Gulyayev, A. P.; Zakharov, V. A.

43
B

ORG: TsNIIChERMET

TITLE: Grain growth in the presence of recrystallization of high-temperature nickel alloys 44,55 21 44,55, 18 14

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 1, 1966, 22-24,

TOPIC TAGS: grain growth, nickel alloy, polygonization development, metal recrystallization, recrystallization temperature, hot upsetting / KhN77TYu Ni-Cr alloy

ABSTRACT: The properties of high-temperature alloys are largely a function of grain size and uniformity of structure, or of factors which are determined by the previous heat treatment and cold working of the metal. In this connection, grain growth and grain size of KhN77TYu alloy were investigated as a function of upsetting (to 30% of height of the billet) at 950 and 1000°C, respectively. Such a small difference in forging temperature is sufficient to result in radical changes in structure of the metal considering that the recrystallization temperature of KhN77TYu alloy is 970°C. Prior to recrystallization the structure of this alloy is homogeneous, fine-grained.

Card 1/2 UDC: 669.14.018.45:620.186.5

2

The experiments confirmed the assumption that, if the deformation is completed above the recrystallization temperature, the growth in grain size owing to recrystallization processes will vary depending on the degree of deformation and in the zones of critical degree of deformation (~5%) it will be relatively enormous (grain size will increase by a factor of 7). If, on the other hand the deformation is carried out below the recrystallization temperature, recrystallization of the alloy will occur during its subsequent hardening at 1080°C; here the heating rate is a vital factor. At a heating rate of 7 deg/min the relationship between grain size and degree of deformation follows the same pattern as above, but at a slower heating rate, such as 0.5-1 deg/min, critical grain growth is not observed: this is because at a low heating rate and in the presence of temperatures somewhat below the threshold of recrystallization the processes of polygonization are the first to occur, ahead of the other processes associated with recrystallization, and they form a stable substructure which prevents any rapid grain growth. This, incidentally, disproves the notion that grain size decreases with increasing heating rate. What is more, the proneness of grain to grow is inversely proportional to the heating rate: the slower the heating rate is, the smaller is the size of the recrystallized grain, in the presence of small degrees of deformation. Orig. art. has: 2 figures.

SUB CODE: 11, 13, 20/ SUBM DATE: none/ ORIG REF: 001/ OTH REF: 000

GULYAYEV, A.P.; MIROSHNIKOVA, K.Ye.

Intercrystalline corrosion of certain stainless austenitic steels. Metalloved. i term. obr. met. no. 12:2-5 D '65. (MIRA 18:12)

1. Moskovskiy institut khimicheskogo mashinostroyeniya.

L 41078-66 EWT(m)/EWP(t)/ETI IJP(c) JD/HW/JG

ACC NR: AT6026550 (A) SOURCE CODE: UR/2776/66/000/046/0058/0066

AUTHOR: Gulyayev, A. P.; Kozlova, N. A.

ORG: none

TITLE: Stability of austenite and the properties of stainless steels at low temperatures

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii. Sbornik trudov, no. 46, 1966. Spetsial'nyye stali i splavy (Special steels and alloys), 58-66

TOPIC TAGS: stainless steel, austenitic steel, chromium ~~containing~~ steel, nickel ~~containing~~ steel, MARTENSITIC transformation, austenite stability, ~~steel mechanical property, steel subzero property~~ low temperature effect, toughness, tensile strength

ABSTRACT: The effect of subzero temperatures on the mechanical properties and phase transformation of austenitic stainless steels, containing 0.03% C, 18% Cr and 6—20% Ni has been investigated. Steel specimens were annealed at 1250C (to eliminate completely the effect of strain hardening) and water quenched. On the basis of the investigation, the tested steels were divided in 4 groups, according to nickel content or austenite stability: steels with 6% Ni, 8—10% Ni, 12—14% Ni and 20% Ni. Steel with 6% Ni is not fully austenitic at

Card 1/2

room temperature and contains, besides austenite, some delta-ferrite and about 30% martensite. The steels with 8—10% Ni are fully austenitic at room temperature. These steels undergo martensitic transformation at -196C or, under the effect of deformation, at room temperature. The steels containing 12—14% Ni undergo martensitic transformation under the effect of deformation only at subzero temperatures. The M_s point for steels with 10 and 12% Ni is -190 and -250C, respectively, and that of steel with 14% Ni is below -253 C. The austenite of 20% Ni steel is completely stable and does not transform to martensite even in liquid hydrogen (-253C). The mechanical properties of all the steels tested depend basically on the martensite content. The martensite present in the initial structure increases the tensile strength and yield strength and decreases the elongation and reduction of area. The martensite formed during testing does not affect the yield strength but increases the tensile strength and lowers the ductility. The notch toughness is beneficially affected by Ni; for instance, steels with 12, 14, and 20% Ni at -80C have a notch toughness of 18—24 mkg/cm^2 compared to 3.5 mkg/cm^2 for steel with 6% Ni. The highest tensile strength, 150 kg/mm^2, and yield strength, 145 kg/mm^2, at an elongation of 5% and a reduction of area of 40%, were obtained in 8% Ni steel after rolling at -196, which resulted in the formation of 70% martensite. Orig. art. has: 7 figures and 1 table. [WW]

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 001/ ATD PRESS: 5057

L 30195-66 EWT(m)/EWP(k)/EWP(t)/ETI IJP(c) WW/JW/JG

ACC NR: AP6025720 SOURCE CODE: UR/0365/66/002/004/0444/0449

AUTHOR: Gulyayev, A. P.; Ababkov, V. T.

53
50 B

ORG: Moscow Institute of Chemical Machinebuilding (Moskovskiy Institut khimicheskogo Mashinostroyeniye)

TITLE: Corrosion resistance of molybdenum alloys in sulfuric, hydrochloric, and phosphoric acids at elevated temperatures under pressure

SOURCE: Zashchita metallov, v. 2, no. 4, 1966, 444-449

TOPIC TAGS: molybdenum alloy, titanium containing alloy, zirconium containing alloy, tungsten containing alloy, yttrium containing alloy, carbon containing alloy, alloy corrosion, acid corrosion, sulfuric acid, hydrochloric acid, phosphoric acid, corrosion resistance, corrosion rate

ABSTRACT: The corrosion behavior of three molybdenum-base alloys, arc-cast alloy TsM-2A (0.1% titanium, 0.1% zirconium), sintered molybdenum-zirconium, and of molybdenum-tungsten-yttrium-carbon alloys in sulfuric, hydrochloric, and phosphoric acids at boiling temperatures and at 185C has been tested. In boiling sulfuric acid at concentrations up to 60% all the alloys tested had a corrosion rate below 0.1 mm/year. With increasing acid concentration the corrosion rate increased sharply, to 1 mm/year at 70% concentration and 10 mm/year at 80% concentration. At 185C the corrosion rate of none of the alloys exceeded 0.1 mm/year at acid concentrations up to 70% (60% for TsM-2A alloy). In boiling hydrochloric acid at concentrations up to 20% the

Card 1/2 UDC: 620.193.56:669.228

L 38995-66

ACC NR: AP6025720 3

corrosion rate varied from 0.02 mm/year for TsM-2A alloy to 0.04 mm/year for molybdenum-zirconium alloy. At 185C an acid concentration of up to 35% had little or no effect on the corrosion rate, which varied from 0.005 mm/year for TsM-2A alloy to 0.02 mm/year for molybdenum-tungsten-yttrium-carbon alloy. In phosphoric acid at concentrations up to 90% none of the alloys tested corroded at a rate higher than 0.04 mm/year. Orig. art. has: 5 figures. [DV]

SUB CODE: 11/ SUBM DATE: 27Oct65/ ORIG REF: 005/ OTH REF: 004/ ATD PRESS: 5050

Card 2/2 HS